

SYSTEMS APPROACH

PART III

by

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CHAPTER XI

VALUES

The practical-minded manager and citizen will long since have asked whether the systems approach has really paid off in practice. Of course the answer he gets to this question depends on the person who tries to answer it. Many practitioners of management science and operations research cheerfully claim savings in the millions of dollars either for industrial firms or government agencies. Others will frankly admit that while there have been savings in some instances, in many cases the studies have never been implemented. Others will point out that although the savings are difficult to pinpoint, nevertheless the whole philosophy of systems approach has introduced a great deal of rationality into organizations so that total effectiveness has obviously improved.

However, any evaluation of the systems approach evidently depends on how we value. Specifically we must turn our attention to what the real objectives of a system are and how the scientist goes about determining them. Unless we know what the real objectives are, it is clearly quite impossible to determine whether any approach to the managing of a system constitutes a gain or a loss.

When I underlined the word "real" in the sentence above, I meant that in the matter of stating objectives people are often deceptive, not necessarily deceptive on purpose but deceptive because they themselves are unaware of what their real objectives are. Stating what we really want is a very personal matter and our statements may have lots of other

aims besides revealing our real wants and needs: we want to impress people, we want to keep people supporting our projects, and so on. And, naturally, most of the time we don't know what we want.

Consequently, the scientist and planner understand fully that to "pinpoint" the real objectives of a system some detailed study is required.

Nevertheless, we should recognize at the outset that not all the scientists and planners feel that it is their responsibility to determine the real objectives of organizations. Instead, the ultimate objectives, i.e., the policy of the organization, are said to be the responsibility of the managers. These policies are "given" to the scientist and planner who then determine the goals of each stage that best serve the manager's ultimate objectives.

The idea that the scientist and planner are not responsible for determining the ultimate objectives might be called an "engineering philosophy," because in the profession of engineering this philosophy so often represents a relationship between the client and customer. According to the engineering philosophy it is up to the customer to specify exactly what is wanted. An easy example occurs when a customer comes to shop at a department store. The managers can reasonably expect that the customer will know what he wants, so that the clerk who is there to serve him can determine whether there are items on the shelf which satisfy these customer wants. Similarly, if an industrial firm wants to acquire a piece of equipment, e.g., a computer, it must specify what it wishes the equipment to do, and the engineering department or engineering consultant will then try to determine whether such equipment exists or needs to be developed.

Of course in many cases a customer may not be exactly sure what he wants, simply because he has not been able to make his needs specific enough. Consider, for example, that elusive problem of designing a house. It's obvious that the architect cannot resort to the tactic of merely questioning his clients as to what kind of house they want. He must try out various kinds of spatial arrangements and by getting his clients to react to them he acquires some deeper knowledge of what their true wants are. The clients also learn a great deal about themselves in this process. Consequently, in architectural design there is a modified engineering philosophy in which the architect and client try to work out a mutual understanding of the client's real values.

We can see the need to modify the pure engineering philosophy very clearly in the case of the design of computer installations. An organization which is essentially unaware of the potentials of the computer may express its "real" needs very poorly. Hence the larger computer corporations use "systems engineers" to assist the client in defining his needs so that they fit the reality of the computer more closely.

But even the modified engineering philosophy is not a satisfactory basis for the design of change in organizations. It is not satisfactory because it assumes that eventually the customer or manager will always be able to make his real needs sufficiently clear so that the scientist and planner can design the desired system, i.e., the system that best serves the objectives of the customer. However, there is the psychological fact that the statement of needs and wants is often confused and frequently wrong, simply because statements of wants and needs, as I said, serve so many different purposes for the individual. Managers are quite willing to state the positive side of their wants and needs, i.e., the objectives that

glow, so to speak, and make their organization appear fine and upright. They want to speak of service to the public, technological advance, dividends for stockholders, numbers of classrooms, amount of throughput of traffic, and so forth. They describe the "objectives" of their organization in terms of these positive values.

But in all determinations of objectives there is the negative side as well: not all the positive objectives can be attained at the maximum level. We have already seen this point frequently occur in the discussion of the systems approach. In the input/output model it is necessary to "constrain" the system in various ways, that is, to impose limitations on various kinds of positive activities. Thus there will be a limit on the number of students that can be educated or the salary of the faculty. The industrial manager must admit that he does not wish to exceed certain costs in production and consequently that he is willing to produce items that are defective, or he is willing to have shortages, or he is willing to fire workers, or he is willing to incur strikes, and so on. All these negative aspects of the organizational enterprise have to be brought out in the determination of the real objectives.

But it is clearly quite difficult, if not impossible, for the customer to specify these negative objectives because often he doesn't even think about them, and if he does think about them he tries to recast them so that from his point of view they no longer exist. No amount of questioning or probing is apt to bring out the true nature of the negative constraints that the manager is willing to incur.

There are other reasons why mere verbal probing may not reveal the real objectives. Consider again the case of the design of a house. The client at the outset is not looking at the real system but instead is

discussing some ideas about the system as they appear in various drawings. Because he is dwelling in the realm of ideas as opposed to the realm of physical arrangement, what he says as he wanders through the realm of ideas may not at all reflect his wishes in the real physical environment. Indeed he is often astonished to see how the ideas turn out in the real construction of the building.

Finally an even more serious difficulty of modified engineering philosophy occurs in those social systems where there is no opportunity whatsoever to ask the customer what is needed. In the case of the design of a highway system, for example, it is not feasible to ask everybody in the community exactly what his needs are. Of course the scientists and planners may conduct various kinds of surveys to determine traffic patterns, but these are at best very weak types of evidence concerning the real needs of the citizen. The fact that people take a certain route does not imply that this is the route they wish to take. And even if one asked them what route they wished to take they would not be able to respond in any effective manner simply because they are unaware of the alternative possibilities. For example, they may not realize the potentials of electric cars as opposed to the present automobile. They may not realize that in the future automobiles can be guided by electronic devices. How could the citizen possibly state his real preferences with respect to transportation when the alternatives have to be presented to him in such futuristic terms? But even more important for most buildings and highways with a survival time of at least fifty years, the real customers are in the future, and of course there is no possibility whatsoever of asking them what they need except by assuming that they will be very much like we are.

The proponent of the modified engineering philosophy, therefore, is pushed into the position of saying that he will only undertake problems

of the design of systems when the objectives can be stated in a reliable manner. This greatly narrows the opportunity of the scientist and planner and is a position very hard to justify until we have explored in some depth the possibility of a scientific determination of objectives. If there is a methodology by which the scientist can determine the real objectives of an organization, then it's difficult to see how the scientist and planner can exclude this phase from their studies. They could only do so if they argued that properly the manager must determine the objectives. But how could they understand what is proper without having again looked at the entire system, including its objectives?

Hence we will assume that the question of the real objectives of an organization is a legitimate question for the scientist and planner to try to answer provided that they can find some suitable methodology for doing so.

As a beginning, in thinking about the objectives of a system it is natural to ask whose objectives are to be served. Since we will be assuming that the answer to this question is in terms of certain people, let's call the set of all such people the "customers" of the system. The customers, in other words, are the people who should properly be served by the operations of the system. In the case of an industrial firm the "customers" are not only the people who buy the products but also the employees, stockholders and perhaps interested sections of the public. In the case of a government agency the customers are a subset of the citizens.

It's essential that the scientist and planner identify the customers because only then can they have a basis for determining the real objectives. We note right away that the role we have previously called the "decision maker" may not be the same role as the one we

are now calling the customer. The decision maker is the person who has the ability to change the system, i.e., the responsibility and authority for such change. Evidently the customers of an industrial firm or of a government agency are in no such position. But the scientist and planner will point out that the manager behaves correctly if he serves the customer's needs and incorrectly if he does not. Consequently, it is in some sense the customer who "decides" how the manager should behave. In this sense the customer could be thought of as the decision maker because he provides the base in terms of which the decision making ought to occur in the proper design of a system. Hence in an indirect sense the customer is the decision maker, and the scientist and planner so consider him in this discussion.

The problem of the scientist and planner is now to determine the real objectives of the customer. In the simplest case the customer will be a single person who is identifiable and who can be studied in such a way that his real needs will be revealed.

Here we come to a parting of the ways among the scientists. Many management scientists and planners will attempt to relate the real needs of the customer to an economic base and specifically to net dollars accruing to the customer in each stage of the system's operation. Another set of scientists, however, will argue that the dollar alone is not a representation of real objectives and that in addition one must study the behavior of the customer. We'll consider the "behavioral scientist" in the next chapter and turn our attention specifically to the theory of the economic base of objectives in this chapter.

The management scientists who try to relate the real objectives to an economic base have some convincing arguments in their favor. As they

point out, we live in an economic culture, that is, a culture dominated by monetary considerations. It's true that the customer does not want dollars just to own dollars, but whatever his wants, they can be satisfied by the exchange of dollars. Consequently, the possession of dollars is a sound substitute for his real objectives. Therefore, it is quite proper, says this management scientist, to use the dollar as the scale along which the merit of a system is to be measured. Of course this is not all there is to the story because we may have to modify the dollar values in various ways, but the modifications will all be in terms of mathematical functions and the basic quantitative unit will still remain in dollar terms.

Thus the economic hypothesis we are not investigating says that the real objectives of most customers of systems are determined by the (modified) net dollar return, and the measure of merit of a specific design of a system will be along a monetary scale.

This idea has already been illustrated in the story of the alcoholism mission of Chapter IV. Here it was suggested that the seriousness of alcoholism could be measured in terms of lost days of gainful employment, and that these lost days could be translated, in principle at least, into dollar values for the citizens of the state. Note that the scientist and planner think in terms of net gain rather than gross gain. The net gain is the difference between the total gross dollar gain of the system to the client and the cost of the system for the client. In many cases the scientist and planner express this idea of net gain in more general terms by talking about the total benefit that arises, say, from an Apollo program or the building of a house minus the costs that are produced by such programs. The word "benefit" is used in the economic sense in order to highlight the fact that benefit minus cost can be used not only by industrial

firms but by government agencies. It's true that a government agency is not "out to make a profit," but it is out to make a benefit for the citizen and the specific benefits that it tries to generate are economic benefits. Consequently the same basic philosophy of "net profit" that is applicable to industrial firms can be used as well for government agencies, according to the management scientist.

In the case of industrial firms the benefit cost analysis is an old concept. For centuries accountants have been struggling to represent the values associated with the firm in monetary terms, i.e., the assets and liabilities. The operating statement of the firm is supposed to represent the benefits that have accrued to the firm minus the costs. Similarly, many management scientists and economists are struggling to translate the benefits of government services, e.g., post office, patent department, health, education and welfare, and so on, into some kind of "national accounting system" with a monetary base.

Cost-benefit analysis as it is currently being practiced in government represents a broader viewpoint of the missions of government agencies than was possible under older accounting and budgeting practices. The cost benefit analyst is interested in determining all the relevant economic benefits that accrue as a result of a given kind of activity. In order to do this he must build at least a crude economic model where the benefits are represented in economic terms. The purpose of the model is to try to answer the following question: what costs and which benefits are to be included? how are they to be valued? at what interest rate are they to be discounted? what are the relevant constraints?

In effect, cost benefit analysis generalizes on the management scientist's idea of measuring the performance of a system in dollar terms. To see how such a measure might be created, consider, for example, the

design of a new school building in an urban district. The cost benefit analyst will begin to think in rather broad qualitative terms about the real objectives of such a building, e.g., the education of grammar school children, the supplying of work for teachers and for administrative personnel, upgrading the value of property in the neighborhood, and so on. He then sets to work to try to define these objectives in more precise terms. He might translate the vague objective of "education of grammar school children" into a specific objective, for example, the completion of the sixth grade at a satisfactory level by at least 100 children per year. In considering economic benefits to the employees of the school he might specify that the objective is to attain a total income produced by the school for teachers, administrators, janitors, etc. of at least \$300,000 per year. He might define the upgrading of property in terms of an increased average value of real estate in the area of the school of at least 2%.

The management scientist has now succeeded in quantifying the objectives, but the quantities are expressed along different scales. In the first case, the number of children graduating is not yet in the dollar terms used to define the benefit of incomes of the employees of the school. In order to find a common economic unit, the scientist might try to express child education in terms of its economic potential for the community: he might express the completion of grammar school education in terms of its contribution to potential income on the part of the working adult. His economic model would include probabilities of drop-out, of death, and so on.

If the cost benefit analyst fails to find an obvious translation of an objective like the safety of automobiles into dollar

terms, he may still attempt to make the translation by other means. Suppose, for example, he could get representatives of the customers to rank the objectives and tentatively to assign weights. If some of the objectives are in dollar terms, then the weights will enable the cost benefit analyst to translate the other objectives into dollars as well. Thus, if the representatives of the neighborhood rank the objective of educating children up to the level of the sixth grade as twice as important as the potential net income produced by the school, the cost benefit analyst might feel justified in evaluating the education of the 100 children as twice the net value of the dollar income of the teachers, administrators, etc., i.e., at \$600,000 per year.

To make this example specific, consider some possible objectives of a school system: education, job opportunity, recreation, social meeting ground. The citizen first ranks these objectives and then assigns numbers between 0 and 1 to represent their relative values for him: e.g., education (1.0), job opportunity (.5), recreation (.1), social (.05). In making these judgments, says the scientist, he is performing much as he would if asked to judge the physical weights of various objects; he is saying that for him education is twice as important as job opportunity, and the latter is five times as important as recreation, and so on. In this exercise the management scientist is taking a step in the direction of the behavioral scientist of the next chapter by attempting to examine how people react in various situations. When he asks people to set weights on the objectives, he is in effect asking them to express the sacrifices they would be willing to incur. Thus when ^{someone} A says one objective is twice as important as another, he is saying that he would be willing to give up or trade "two units" of one objective for one unit of

the other.

It is perhaps a surprising but nonetheless true fact that people seem quite capable of making such judgments, both about physical and value "weights." Whether the latter are as reliable as the former often turn out to be is a matter of debate. But we should note that if there is some reasonable confidence in the customer's value judgments, then the management scientist can usually convert all objectives into economic terms. To do this, he must express each objective in quantitative terms, as before. Thus the "educational" objective was the graduation of 100 children from the sixth grade per year. Since he judges this objective to be twice as important as the job opportunity objective, the scientist sees how to reduce "education" to dollar terms. The job opportunity was defined as \$300,000 a year. Hence the total educational objective for 100 students is \$600,000 a year, or \$6,000 per student graduated.

Both the cautious scientist and the indignant humanist will sense real difficulties here; the scientist because the transformations need to be more carefully specified, the humanist because it all looks like a trick of "scientism." The cautions of the scientist can be heeded in practice, to yield more reliable economic translations of objectives; whether the outrage of the humanist can also be taken care of remains to be seen.

As a final check on his economic estimates, the scientist may examine past decisions on the part of the managers. He recognizes that in any rational past decision, the manager himself must have made implicit judgments about the relative values of his objectives, and since some objectives are bound to be economic, the scientist can also evaluate the others in economic terms. For example, most of us recognize that it is very difficult to determine the dollar value of an accident, but if the

scientist can determine how much money is put into safety devices on automobiles, aircraft, roadways, and the like, he may be able to infer from past behavior what the implicit dollar value of a life or limb that has been assumed by the managers.

So far we have been assuming that the scientist can identify a single decision maker. But in all of the illustrations we have been talking about many customers rather than one. Only in the case of the department store purchaser was the single customer apparent. In this case it looks as though the manager had every right to assume that the person to be served by the system at that point in time was the single individual who arrived at the counter. Clearly in the case of the design of buildings or schools or hospitals there are a large number of customers, and it would seem very unsafe to say that there exists a single person who truly represents all of these customers' interests. Or, if the scientist were to make such a statement, he would certainly have to determine the correct manner in which customer representation is to be made. Consequently, to say, for example, that the school board is "the" customer of the educational system is not to solve the scientist's problem in any way. The scientist operating under the systems approach must convince himself that the school board is properly representing the true customers, and in order to do this he must examine the real values of many customers.

We can begin to see how the complexities of reality have created serious problems for the would-be management scientist and planner. Things went very well when there was but a single recognizable decision maker and one single stage of decision making. Call this an SS problem. Matters became more complicated in the last chapter when multiple stages

appeared, but still there was a single decision maker (MS problems). Now we are confronted with a multiple decision maker and multiple stages (MM problems). It is no wonder that many scientists and planners struggle to find a representative of the multiple decision maker. The obvious method is to find one single client and expect him to fight the politics of MM later on. This escape, however, is a snare and a delusion, because the single decision maker cannot stand for the multiple client unless the scientist can justify that the single client represents the multiple client. Sometimes, as we shall see, the scientist does not look for a real client, but an ideal or abstract client concocted out of the multitude of conflicting interests. Even so, how does he justify this construct of his mind?

The scientist will reply that the single decision maker is a way at the outset to get started. If_^ he tries to enter the morass of multiple decision makers, he will never be able to make even the first approximations to the solutions of the problems. Call this starting point a myth, if you like. For example, it was even a myth to say that the customer who walks in to the department store is a single decision maker, because most customers represent many different kinds of pressures within the family. Furthermore, this single person standing at a counter is himself a complex of minds, conscious and unconscious,--id - ego - superego - feeling - sensation - intuition - thinking; minds with unique internal politics of their own in each self.

Of course the idea that all real problems are MM problems is no news in the story telling of this book. As soon as the program planner tried to find data on the alcohol mission, he found that the "simple" problem of collecting data is itself an MM problem. In general, the prob-

lem of how to design a systems approach is always MM in all of its phases. Still more generally, the design of any inquiring system is MM. That's why the meaning of "science" is still so obscure despite all the wise talk about it. More on this point later.

But the recognition that all real problems are MM need not stop the scientist and planner so long as he can take all of the relevant interests and combine them into one unifying objective, i.e., one unifying decision maker. As I said, he will admit at the outset that he may be wrong.

Actually, the problem that the scientist and planner face does not seem to be different in kind from the typical problem of any science, because all science exists in a state of uncertainty about many aspects of the world. Science itself must proceed from approximation to approximation. The scientist does not expect to be correct because such an aspiration is not feasible. Instead he uses the method of "explicit assumption making." In the application of this method to the study of systems, the scientist or planner attempts to the best of his ability to estimate a single decision maker in terms of a multitude of customers and their interests. In making his judgment he also makes explicit all the assumptions that he has made so that he himself as he proceeds in the systems design may continuously reconsider his assumptions and so that other scientists or planners may react to his assumption making in an effort to improve it.

The process that we have just described is very similar to the method used by the experimental scientist. Any experimental scientist is aware of the multitude of factors associated with his experiment that he cannot possibly control. What he does not know at the outset is whether these factors will have some influence on his experimental results. If they do, they may so confound the data as to make any kind of inference impossible. What does the scientist do in such a situation? What he does

is to follow the same "explicit assumption making" procedure just described above. He sets down as clearly as possible what he assumes to be the correct state of affairs with respect to the uncontrolled variables. As the experiment proceeds, he can test whether the assumptions are correct; furthermore, other scientists who examine his results will know exactly what he has assumed and will be able to test his assumptions. The idea is that science progresses by continuous modifications of its basic assumptions. At each subsequent stage of science the assumption making is improved. Science will never reach the ultimate ideal of the correct answer but by the method of explicit assumption making it does learn more and more accurately about nature.

To some extent at least the method of explicit assumption making has worked out reasonably well in the physical sciences. Can we expect a similar success in the design of social systems? There are some serious reasons why we might not expect to find any progress occurring. These all rest on the question of what a real improvement in the method of designing systems is supposed to be like. More generally, how does one determine whether there has been an improvement in the understanding of social systems? The problem of the multiple decision maker is to determine how the multitude of decision makers can be unified into a "representative" decision maker. In the language of welfare economics, the problem is to take the various interests ("utilities") of the human individuals who are the customers of a system, to translate these interests into quantitative terms and then finally to create a single measure which represents the unified social preference. The process is very much like the experience we go through each November when we vote for candidates. Presumably there are many different opinions and wants of the citizens. Each citizen goes to the poll and votes for a candidate that most nearly represents

his desires. The majority then stands for the unified decision maker.

Of course such voting is a crude expression of social values, because it wipes out intensities of need or desire, every voter being counted exactly as one. Furthermore, in most democratic societies there is much to criticize about the manner in which the citizen is informed as well as the manner in which alternative choices are made available to him. In more detailed and deeper efforts to design social systems, the scientist or planner needs to try to unify the variation among consumer interests in a much more specific and rational manner. But then the question arises as to how he shall weight the interests of various customers. Is it appropriate in the first place to compare the wishes of one individual with the wishes of another? In other words, even if one makes an explicit assumption that comparison of values is legitimate, how can one possibly justify this assumption under questioning?

Economists for decades have been examining the problem of comparing utilities, chiefly because in western culture there was the expectation that it might be possible to generate a basic economic measure across society in which the wishes and needs of each citizen could be adequately represented in quantitative terms. The critics of this position have argued that it's impossible for the scientist to make such comparisons of individual values because he has no way, so to speak, of getting inside the heads or hearts of individuals in order to make the appropriate comparisons. The critics have argued the only way people can express their wishes is either by verbal statements or by certain types of behavior, and that in neither case can the scientist succeed in making direct comparisons.

In recent years there have been some rather clever attempts to overcome these critical objections by use of probabilities. The basic

notion is that if one can observe the risks an individual is willing to undergo in order to gain an objective, then one can make a comparison on the basis of risk aversion or risk taking. This effort, of course, if carried on in terms of behavior, would take us into considerations of the next chapter and far beyond the typical economic approach to problems of value. Indeed, from the point of view of the behavioral scientist, the notion that one cannot compare utilities is certainly naive, and a behavioral scientist will argue that there are many instances where it's quite feasible to compare individual values. Managers, he points out, are doing this kind of thing all of the time when a city government decides, for example, to build a school in one district rather than in another. Furthermore, from the point of view of psychology, the intercomparison of values goes on inside the same mind because psychologists will recognize that every mind is made up of conflicting minds with their own value systems. The values of the unconscious mind are certainly not the same as the values of the conscious mind, and yet somehow the total mind makes a comparison in order to arrive at a unified expression of its wants.

But even though it may be legitimate to compare human values, it's not clear at all how this comparison will result in a unified representative of the multitude of decision makers. The problem becomes even more critical when we consider the future of the subsystems. Since most important systems survive beyond the generation that created them, then the customers of these systems must include the people who are not now alive and therefore not capable of expressing what their wishes are to be. It's interesting also to point out that the customers of systems are the people of the past. Our grandfathers have a definite interest in the kind of world we live in today and in the world we are trying to create. Their

voice is with us even though their bodies may not be. Consequently, the unified representative must include all of the interests of past and future individuals who cannot be "tested" directly by the planner or scientist.

The future as well as the past is one strong argument against the idea of a marketplace of decision making or a political arena of choice in which each person expresses his values either in terms of the money he is willing to sacrifice or the political power he is willing to express in his vote. The existing consumers and citizens can scarcely be regarded as the representatives of either the past or the future customers of systems. In the free marketplace these will be the unheard voices, unrepresented and unheeded.

Indeed, very much the same story could be told about the single individual in the act of making his present choices. Is he truly representing his past self as well as his future self? And yet, it is these past and future selves that really constitute the kind of person he is, even from an economic point of view.

Thus the scientist's method of explicit assumption making doesn't seem to work well in the context where the meaning of the social system stretches into the past and into the future. How will a contemporary scientist be able to check the assumptions of another planner and scientist?

The management scientist's answer must be that however difficult the task, it's essential that we arrive at a coherent and acceptable version of what the future of human systems will be like, in terms of technological innovations, national and international politics, the economic development of nations, and so on. This interest in the assessment of the future has become quite popular in recent years. Indeed, in both France and England there has arisen a movement to examine the nature of future societies, and in the United States a commission was appointed

to consider the state of the nation in the year 2000. All of this future-looking activity is an attempt to answer the critics of contemporary science and planning who argue that the interest in technological innovation and the curing of today's problems as such may very well lead to a worsening of conditions in future generations.

The question, however, as I have said, is one of methodology. How can future wants and future conditions be properly estimated? One notion is that there are some intellectuals who have spent a great deal of time considering the nature of society and that these men therefore are in the best position to express an "expert" judgment concerning future conditions. In order to bring out their expertise in a clear fashion it may be necessary to structure their deliberations in some specific manner, e.g., by letting them interact with each other's judgments and reformulating their judgment in a sequential manner. This is the purpose of the so-called "Delphi technique" for forecasting by means of expert judgment. The Delphi technique might be amplified by putting the experts in an atmosphere of debate so that their implicit assumptions can be made explicit.

The critic nevertheless will argue that the entire effort may be a misguided one, simply because what is being looked at in the future is the wrong kind of thing. His feeling will be that the determination of economic benefits is only one aspect of the total value picture. If the management scientist replies that it's only up to him to supply the economic aspect of the situation and up to the managers to "fill in" the other relevant aspects, then the critic has every right to claim that the separation is a spurious one. It may not be possible to look at economic benefits in isolation from other kinds of deeper human values of

recreation, of safety, of family relationships, friendships, and so on.

What has been guiding the management scientist and planner in their thinking about systems has always been the feasible. The economic values are much more feasible to look at than are the more elusive "humanities" values. The economic values seem to be out there in explicit form, either in dollars or in the more tangible aspects of technology like equipment and service. The hidden, human values are "in there" and cannot be adequately ascertained in such a manner that one can use them in the redesign of social systems.

But this adherence to the feasible is exactly the point that the humanist will wish to attack. The feasible and the explicit may not be the correct basis for human decision making. Those who typically try to approach reality through spectacles of the feasible are those who create the ugly monsters of our current technology. They are those who forget the really critical human values of poverty, distress, mental illness, and the like. They sweep out in one large housecleaning all of the real aspects of human values that are so dusty from their point of view that they cannot be figured into anything except waste. The most arrogant of the feasible-minded actually believe that by considering economic values they can eventually handle all of the intangibles in an implicit manner, much as though the human being was an economic being and that all of his values are tied into his basic economic interests.

Interestingly enough, the debate at this point has become a debate about values, namely the values of those who wish to change human systems by means of science or planning or some other intellectual resource. The values of the individuals who view the design of systems from the economic point of view are the values of the explicit, the precise, the "rational."

They believe themselves to be most allied with the practical-minded managers who like to see a problem laid out in an explicit form so that they can understand it. The more elusive, intangible parts of values, therefore, are to be ignored or else handled by personal judgment. The values of their opponents, the humanists, are the deeper individual human values arising from the real feelings of each person. These cannot be represented, says the humanist, by any kind of explicit assumption making method. They cannot, because the real values of a person are not the kind that can be determined by any kind of "investigation," either by scientist, planner, or whatever.

But there is another kind of scientist who tries to bridge between the economic-feasible approach to the change of systems and the humanist demand for the representation of "real" human values. This is the "behavioral scientist," a man dedicated to investigating what the human being is like in terms of his behavior. This scientist is less interested in model building than he is in the empirical determination of what human beings do and how their minds are made up. It is his belief that the empirical investigation of human behavior will eventually lead to a sound understanding of the nature of the human being and his societies. Once the soundly based empirical findings have been accumulated, then, say some behavioral scientists, we will be in a position more adequately to plan for human development.

The difference is essentially a difference between reason and sensation, between the rationalist and the empiricist. It is, as I have said, a difference in values, and in order to understand the values of the empiricist and how they may eventually tie into the systems approach, it is necessary to give a brief survey of the findings of behavioral science.

CHAPTER XII

BEHAVIOR

The behavioral scientist is an individual who believes that by observing how people behave in their environment it will be possible to describe their minds, ambitions, and frustrations, and eventually to see how these all fit together in one large pattern. Once the empirical investigation has reached a successful end, then the nature of human societies will be understood and consequently the basis for the design of human societies will be the hard core data about human behavior, rather than the assumptions of models.

To speak of "observing people in their environment" sounds much like the language of a biologist who so carefully observes the behavior of living forms. And the behavioral scientist finds much inspiration in the history of biology. After all, it was only in terms of very detailed collection of data about living beings that evolutionary theory was able to grow. Biology did not develop from an a priori notion that the living forms should display themselves in the hierarchy of living beings. Instead careful observation was essential before even the idea of evolutionary theory could be created, according to the behavioral scientist.

Perhaps one way of describing the behavioral scientist's approach to systems is to say that he has really inverted the management scientist's and planner's approach. The latter see the nature of the whole system as a determinant of individual behavior. For the behavioral scientist, on the other hand, the "whole system" is made up of the behaviors

of the individual persons. Once individual and social behavior have been examined in detail, then one can discover in the observations of behavior the nature of the whole human system.

Because the behavioral scientist is so intently interested in observing how people behave, he is correspondingly less interested at the outset in the difference between the good and the bad, or between the efficient and the inefficient. He wishes explicitly to keep the problem of evaluation out of his observing system lest his own evaluations distort the information that he receives. He wants to be the disinterested observer, a role that he firmly believes has been well established in the physical sciences. The experimenter in the physical laboratory does not regard himself to be part of that which is being observed. No more, says the behavioral scientist, should I be a part of the social system that I am observing.

At the very outset, therefore, the role of the behavioral scientist may seem unsatisfactory to the humanist. The behavioral scientist may in fact begin to look something like a snoop. Indeed, says the humanist, the best way to be a disinterested observer is to use hidden tape recorders or to wire tap the rooms of each home in the community. Thereby the most "objective" data about human behavior will be collected.

The problem of the disinterested observer will plague the behavioral scientist throughout our discussion of him. In fact, in some sense the problem makes his role ambivalent. On the one hand, he wishes to study human behavior, but on the other, he realizes that in order to do so he may at times have to become deeply involved in the lives of those whom he observes.

How shall we study human behavior, therefore? In order to keep the motivation of disinterestedness at a maximum the most likely methodology

would seem to be the method of laboratory experimentation. A chemist brings a piece of material into the laboratory and does various things to it, the material reacts in various ways, and from these reactions the chemist produces some basic information about the nature of the material. By analogy, therefore, the behavioral scientist should bring people into the laboratory where he can carefully control the variables, do certain things to the people, and observe how they react.

The laboratory has become a common tool of many behavioral scientists. People are asked to do fantastic kinds of things within the laboratory setting. In early experimental psychology they simply lifted weights, looked at lights, and made judgments of intensities of sensation. Nowadays the human subject is asked to solve problems, to react with other human beings, and even on occasion to undergo electric shock.

There is one group of behavioral scientists who are very much interested in the nature of human conflict, because it is such an important ingredient of large social systems. The subjects of their laboratory experiments are therefore put in a conflict situation, e.g., one in which they play a game where one subject must be the winner and the other the loser. In these experiments, the behavioral scientist wants to test some of the hypotheses of "game theory." Game theory purports to provide rational strategies for human beings who must behave--as in games--according to prescribed rules. The rules state the choices of each player and the "pay-offs" that occur as a result of each choice.

A very simple game is one in which each player has a choice between two moves, A or B. In such a game, the pay-offs might be as follows:

AA (Both choose A):	5 cents paid to player no. 1, 5 cents lost by player no. 2
AB (First player A, second B):	zero to both players
BA (First player B, second A):	zero to both players
BB (Both choose B):	5 cents lost by player no. 1, 5 cents paid to player no. 2

Common sense says that the first player will avoid choice B like the plague since he either gets nothing or loses; similarly, the second player will avoid choice A. Hence the "rational" choice of the two will be AB, where neither wins anything. In a laboratory setting with real players, one would expect to find this common sense result repeated.

The game described above is called "zero sum" because the total payoff to both players is always zero, no matter what choice they make. The more interesting (and perhaps more realistic) games are non-zero sum. One example of these has fascinated the behavioral scientist. It arises from a story told about two captured criminals, Merrill and Anatol. The sheriff tells Merrill that if he squeals on Anatol, he (Merrill) can get off with a light sentence, while Anatol goes to jail for life. The sadistic sheriff whispers the same deal to Anatol: squeal and you get a light sentence, while Merrill gets life. If neither squeals, they both get medium sentences. If both squeal they both get life. This "prisoner's dilemma" can be captured in a simplified version by the following game (same notation as above):

AA:	both get one cent
AB:	A gets 5 cents, B loses 5 cents
BA:	A loses 5 cents, B gets 5 cents
BB:	both lose 3 cents

Note that there is no "common sense" choice, but that BB seems all around to be the fairest solution. But now if the first subject can convince the

second to play choice B, the first may then "defect" and switch to A, thereby producing AB in which the first gets 5 cents and the second loses 5. The empirical question therefore is which is valued more, the economic gain to one of the players or the removal of conflict. By observing how people react in the laboratory to a prisoner's dilemma game, the behavioral scientist believes that he can determine the relative values of conflict and cooperation for human beings. In this way, so goes his reasoning, he may be able to supplement the systems approach based purely on economic considerations by more realistic considerations of the values of cooperation and conflict for decision makers. Digging deeper along the same line, the behavioral scientist discovers that the preference for cooperation over personal economic gain, or mere conflict for its own sake, depends on other psychological characteristics; thus there are "conflict types" and "cooperative types," the well known "hawks" and "doves" of the current political scene. This turn in the investigation goes under the label of "psychological correlates," the idea being that there is no underlying consistent pattern of behavior throughout the human species. Instead we humans as a species can be broken down into types and the behavior we exhibit under various laboratory situations depends on our type.

The critics of such laboratory experiments are quick to point out the unreality of the laboratory setting. They claim that the subjects in the laboratory are not necessarily responding as they would normally do in the outside world, but rather are responding to the laboratory environment and especially to the experimenter. Some of the subjects may be highly cooperative, in which case they try to do what the experimenter wishes them to do, albeit at times unconsciously. Others are highly un-

cooperative and try to ruin the experiment. In either event what is being "discovered" is not typical kinds of human behavior but rather the reactions of individuals to a highly controlled, constrained environment.

It is because of such criticisms that many behavioral scientists have shunned the laboratory and turned instead to real organizations. There they try to describe what "really" goes on in organizations in terms of a detailed "case history." The investigator identifies an important problem of the organization and studies how people react to the problem both in terms of personal relations and the politics of the organization. The observer writes out these reactions in detail, and the story becomes the basis of discussion. The discussion itself may eventually lead to certain "principles" of organizations, e.g., that the span of control of the manager should be limited, that it is essential to provide a basis for "group motivation," and so on.

The laboratory scientist often criticizes the case history method rather violently. He points out that in each case history an enormous number of variables have been neglected simply because the case historian could not possibly have had a knowledge of all the critical aspects and may in fact be telling entirely the wrong story. The case historian is very much like any historian. He must separate out from the welter of historical events those particular ones that he thinks are important. He has no notion whether these really were the important events of the time, and consequently the story he tells may be thoroughly distorted, deceptive, or just plain wrong. Therefore, says the laboratory behavioral scientist, it is essential to study people under controlled conditions, at least to check the accuracy of the case history method.

This is not the end of the debate, of course. There are others who feel that the correct way to look at human behavior is to take the single

individual and measure various aspects of him in isolation from others. This can be done without having to undergo very rigid laboratory control situations, e.g., in the free atmosphere of an individual's home or office, by means of both questionnaires and open-ended interviews. Thereby, says this behavioral scientist, one can determine the basic attitude and opinions of individuals and eventually go on to the study of individual preferences, a subject of much importance in our discussions in earlier chapters. Thus in our culture we have seen a large proliferation of public opinion testing, determination of personal attitudes toward the church, education, conservation, and so on. Some scientists think we are in a far better position today than were our ancestors to understand the basic political attitudes of the citizen. They make very fine distinctions about the far left and moderate left, the middle, and so on, based on what the behavioral scientists believe to be a sound empirical study of the attitudes and beliefs of individual citizens.

Of great importance in the improvement of the systems is the measurement of human values by means of observing human behavior. Note now the important difference in attitude between the economic scientist and the behavioral scientist. Whenever a value like safety, recreation or education seems to transcend economic considerations, the economist of the last chapter will struggle to reduce the "intangibles" to economic scales by one of the methods we discussed there. The behavioral scientist, on the other hand, wishes to start from scratch without making any presuppositions about the value of money or any other commodity. He wants to see how people behave when placed in an environment of choice. If they make one choice, this is taken as behavioral evidence of their values. They may, in fact, forego money for some other kind of commodity, and this choice can only be determined by observing their behavior.

Nevertheless, the empiricist at this stage does have to make some assumptions. One basic assumption he makes is that the alternative choices that a person can make in a given environment can be ranked. There will be a "top choice" which is preferred over all the rest, and a "bottom" choice which is the least preferred, and in between in rank order will be all the other choices. Of course, the same assumption is made by the economist; in his case, he assumes that more money is always more valuable than less money.

As I mentioned in the last chapter, some rather clever uses of risk taking and risk aversion can be used to translate these rankings into some kind of number scale called the utility scale. In the use of the utility scale, the economist and behavioral scientist are much alike, the only difference being the economist's desire to ground the scale in economic value. But behavioral scientists, being freer in their conceptualizations, concoct all sorts of other value scales, consumer preferences, attitudes, "basic values," even the "value" of a way of life. These scales are supposed to describe true values of an individual person. In the application of this empirical method to the management of systems, the managers would be presented with various objectives of the system. In order to make any sensible judgments the objectives must be "pin-pointed," i.e., made very explicit. For example, in the design of an urban community the objectives might be spelled out in terms of the amount of recreational space and facilities, the number of students graduated from grammar and high school, the amount of police protection, the amount of "throughput" of traffic on the streets, etc. The managers would then be asked to rank these objectives and by various kinds of questionnaire techniques the behavioral scientist would hope to assign values to the objectives that accurately represent the manager's

interests. This empirical approach to the identification of the objectives of the managers could then be used as a basis for developing the measure of performance so critically required by the management scientist.

Many behavioral scientists today would hesitate to apply their science in this manner, feeling safer to work in less confusing environments than management decision making. But in addition to the technical difficulties of such an application, there is the question of whether a stated preference per se means very much in terms of real values. Furthermore, the preferences must be made over an explicit set of objectives, so that many of the hidden objectives are not represented. And as I mentioned in the last chapter, the unheard voices of the past and the future certainly do not get into this empirical setting. The behavioral scientist will reply that the stated preferences must be regarded as only one kind of evidence of value. The evidence must be supplemented by a number of other findings, e.g., the actual choices a person makes in "real life" situations. Of course at this point the entire methodology becomes quite fuzzy. After all, statements are "behavioral choices," so that if someone says he prefers A to B, he is making a choice, perhaps as significant a choice as physically taking A instead of B. Unless we know a great deal about a person, we cannot tell by mere observation of his behavior just what his choices mean relative to his true values.

Perhaps of all the developments in the area of behavioral values the one that is most relevant to planning is the concept of a level of aspiration. The idea is that although in principle there may be an optimum solution to systems problems, the human being seeks only a certain level beyond which he does not want to go even though there might be benefits that exceed the costs, so to speak. A good example is the person who is looking for a house and does not try to explore all the

possible houses available on the market. Instead he sets his level of aspiration at a certain point, and then if he finds a house that sufficiently pleases him, he buys it, even though he might realize that there are better houses available.

Consequently it has been suggested to the management scientist and planner that instead of looking for the "optimum" solution to systems problems, they consider solutions in the more realistic terms of the behavioral scientist. The behavioral scientist argues that the "correct" design of a system should be geared to the level of aspiration of the customers of the system and not to the idealistic full optimum in the economist's sense. A good deal of debate has occurred in the discussion between the two scientists, the economist and the behavioral scientist, about levels of aspiration. From the economist's point of view it looks as though the behavioral scientist is merely stating the economic fact that it costs something to search among alternatives. If this cost of search is included, then the whole concept of the level of aspiration is adequately represented in the economic models. It would be absurd for a manager to go on searching for a solution when the additional refinements do not pay for the expense of search. The economist, therefore, claims that the behavioral scientist has introduced nothing new in his empirical findings that was not already included in the economic considerations. The behavioral scientist, on the other hand, replies that the level of aspiration is an integral part of human behavior and it cannot be translated into economic terms.

From the systems point of view, the debate between the economist and behavioral scientist fits into the larger consideration of how the manager ought to spend his time--i.e., what issues he should pay attention to and in what depth. Every manager comes to realize that he cannot pay

attention to every "important" matter; few managers are self-conscious enough to understand why they pay attention to some matters and not to others. The economist would say that this problem fits into his general scheme of the allocation of scarce resources--in this case the manager's time--and is solvable in principle by an allocation model. The psychologist would argue that the problem depends on the basic psychological characteristics of the manager--i.e., his level of aspiration for various tasks. If both economist and psychologist are explicit enough, they might resolve their differences by means of a general model of managerial time allocation. But, of course, there are many managers who would regard such an effort to be largely irrelevant.

So far we have been discussing studies of human behavior either in the laboratory or in interviews and questionnaires. We now turn to those studies which are essentially examinations of social groups and their behavior in their "natural setting." An intermediary type of study is called "gaming" (not to be confused with "game theory" discussed above). In gaming, the managers are placed in an environment that somewhat simulates their natural habitat, not unlike the animals of a modern zoo. Thus industrial managers make decisions in simulated business games, and ambassadors "play out" the weighty problems of their politics in simulated international games. The behavioral scientist sees in such games the advantages of (1) training, (2) ability of managers to see how the whole system works, (3) ability to abstract the critical elements of their decision from the less critical (for example, international negotiators in the simulation can discuss the essential aspects of international problems without having to worry about their own country's internal politics). The critics of gaming argue that the seeming reality of the game may be thoroughly deceptive. Their point is that the human

animal can be observed reliably only in his natural setting. Here again is the debate between the hard core empiricist and the more theoretical scientist. It is, of course, a debate about the system of science itself.

Among the studies of humans in their natural setting, perhaps one of the most relevant from the point of view of the systems are those that describe sociometric relationships, i.e., how people get along together in groups. The social psychologist is curious as to why it is that certain groups seem to succeed so well in the formulation of their ideas, whereas others never get anywhere. One suggestion is that in the successful groups one or two people adopt a strong leadership that keeps things going in the right direction. The opposing point of view is that the successful groups develop their own kind of sharing of ideas and do better in relatively unstructured situations. The designing of groups that work well together has been a major objective of the social psychologist. The contribution of these studies to the systems approach rests on the fact that all system designs have to be produced by group task forces of one kind or another. Consequently, says the social psychologist, it is tremendously important to understand how groups work together.

Furthermore, when the scientist or planner has developed his solution to a systems problem he has to interact with the manager. This is a problem that has been mentioned earlier in the organization for planning. The suggestion made there was that the managers play an active role in the planning organization. But from the point of view of the social psychologist this is not enough. One has to explain how this role is to be created. It is important that the manager feel the recommendation to be a result of his shared activity in the whole group. If he does feel this, says the behavioral scientist, then implementation of the solution is apt to occur. If not, then the alienation between the planner and

the manager is apt to be so great that no implementation will occur.

Few management scientists can deny the great importance of implementation. Although of course there is no data on the number of successful implementations that have occurred in the last decade, there does seem to be a great deal of evidence that many studies have simply died on the vine with a consequent waste of many man hours and dollars as well as huge disappointment on the part of the people who have put so much of their psychic energy into the effort. The failure to implement recommendations, says the behavioral scientist, arises out of lack of understanding of the human being on the part of the management scientist, oriented as he is to economic considerations. The management scientist, says the behavioral scientist, often fails to understand that there are basic psychological resistances to change, that if change is suggested by someone external to the organization, then there will be a natural resistance, much as the body tries to resist the implant of a new organ. No matter how excellent the new organ may be, the bodily framework is such that the organism sets up a reaction to it. In the same way, no matter how excellent the recommendation may be of the management scientist, people in the organization will react negatively to his suggestion unless the management scientist takes steps to create an atmosphere where alienation is diminished.

In fact, some social psychologists argue for what they call a "socio-technical system," a system that recognizes both the psychology of the individual and the technical aspects of the system. This effort is representative of a number of attempts to try to bring together the technological and the social side into a coherent package.

In addition to these social psychological studies of group relationships are the larger studies of cultural bias and the role of

language in the understanding of systems. The idea is that in every human society certain basic attitudes are built in that cannot be changed without some total kind of revolutionary or evolutionary development. It has been pointed out, for example, that the way in which we talk about nature obviously influences the way we understand nature. The application of this linguistic principle to the study of systems implies that in western culture we have a typical way of talking about our systems and that our manner of talking about them therefore influences our way of understanding them. We have seen very much this kind of thing happening in the last chapter where the approach to the objectives of a system were framed within economic language. To a person in the western sector of the world this is a very natural way to talk about the system, i.e., its economic objectives and the resources by which it attempts to attain these objectives. But the common language of economics that we all use may very well influence our insight into the nature of systems. Whether the behavioral scientist would be correct in inferring that with a quite different language one would have a quite different systems approach is of course a matter that is up to debate .

Beyond the cultural anthropologist and the linguist lie the even broader studies of politics and law, fields which are virtually unknown by the management scientist and economist. The theorist of law would undoubtedly claim that the lawyer does grasp the system, is able to analyze it and does give the client proper advice about his behavior within the system. Probably most lawyers would agree that the formal procedures of law play only a very small part in the process of law, i.e., the formal procedures are a small component in the total legal system. An adept lawyer knows the nature of the legal system and can recommend courses of action for his client accordingly, but just how he does this

is difficult to transmit to the non-lawyer. Nevertheless in recent years some behavioral scientists have become quite interested in studying various procedures within the law in order to see whether it would be possible to represent the way in which the lawyer interprets human behavior.

We can begin to see from this very brief excursion the wide spectrum of interest of the behavioral scientist, starting in depth with the nature of the individual person and broadening out into social groups, society and cultures. The behavioral scientist studies an individual in terms of the choices he makes, the goals he seeks, his beliefs, his concepts of reality, both conscious and unconscious. He sees the human being as a social individual, studies the nature of society and its behavior, and sometimes he dreams of carrying on his empirical studies to a determination of ultimate human values. What is it that all human beings basically wish to have? In the old-fashioned days men said that the purpose of a system is to create happiness for the humans within it. But for the behavioral scientist happiness is a term devoid of meaning. Furthermore, it's not even true that, when one observes human behavior, people "seek happiness" or even the "greatest good of the greatest number."

Nevertheless, it may be possible by extended study of human individuals and societies to find those very basic things that all humans want, say, technological advance, education, knowledge of the world, cooperation, and perhaps beyond this some non-cooperative values, an urge for change or destruction or even evil. Thus on top of the cake of the behavioral scientists is the fluffy icing created by the speculators who wish to go beyond empirical findings and make vast leaps ahead to infer what it is that specifically characterizes the fundamental needs and

purposes of the human being. These speculators are akin to the grand cosmologists of the physical sciences, who guess about the origin and ultimate destiny of the universe. Most behavioral scientists and management scientists are sceptical about all of this speculation, though they recognize that in their own work in systems they too have to make assumptions about ultimate ethical values: after all, even the sceptic must accept an ethical dogma to the effect that the aspiration to know is wrong.

Off and on I have been speaking of science as a system; in connection with the discussion of this chapter it is interesting to point out that the science which studies systems is itself not a very integrated system. In fact, the behavioral scientist who, as I have been saying, is intensely interested in the nature of social systems, rarely speaks to the management scientist and planner, and vice versa.

Why is it that the behavioral scientists are not well integrated with the management scientists? One would think that the two complement each other. The behavioral scientist provides a rich empirical base and the management scientist provides the structure that can employ this base for making inferences about the changes in social systems.

Probably the best answer is that there is a basic psychological difference between the intellectual who goes into management science and the intellectual who goes into behavioral science. It is the difference between the rational type and the empirical type, between rationalism and empiricism. The rational type finds the ultimate foundation of his work in the model, in a theoretical structure that shows how pieces of reality are put together in a precise coherent fashion. The empirical type, on the other hand, finds his ultimate reality in what he directly

observes going on around him. The rationalist is aghast at the immense amount of data that the empiricist seems perfectly cheerful about collecting. To him the empirical behavioral scientist goes out with his tape recorder and other devices and comes back with an enormous amount of information, and only then begins to worry and scratch his head about how to analyze the information. From the rationalist's point of view this kind of thinking should have taken place at the very outset. How does the empiricist know that any of his data are any good unless he has already made up his mind what is critical and what is not critical in the system? The empiricist on the other hand sees in model building an abstract activity bearing no relevance to the real life situation. He feels that he is much closer to the manager, and indeed in many cases he is. The empiricist can talk directly to the manager in his own terms, become friendly with him and feel that the manager understands what he is up to, whereas the model builder is apart because the manager himself is not a model builder and doesn't understand what model building is all about.

In recent years there have been some attempts to develop a bridge between these two activities, i.e., between what I have called the economic approach to systems and the behavioral approach. The difficulty with the economic approach, as I said in the last chapter, is that it leaves out so much that is really relevant with respect to human values and systems, aesthetics, recreation, health, and so on. Its attempts to translate aesthetics, recreation and health into economic terms seem to leave out the realities of each of these human values. The suggestion has been to develop "social accounting," an explicit technique of evaluating aspects of society from the rich background of the behavioral scientist while at the same time keeping the precision objective of the economist

in mind.

It's difficult to know whether social accounting will succeed in providing the bridge, but even if it does we have some reason to suspect that the coalition that is thus created still may not represent the adequate approach to systems. It may not because the coalition of behavioral scientist and economist still approaches the system from one fundamental viewpoint, a viewpoint that might be called the "planning philosophy." It is the viewpoint that by the use of reason and observation it is possible to lay out the structure of a system and decide what changes should occur that best serve the customers of a system. Is the planning philosophy an appropriate philosophy for human systems? If you say no, then you are someone who believes in anti-planning. To the rationalist it's hard to see how anyone could ever accept an anti-planning philosophy. Indeed, what could an anti-planning approach to systems possibly mean? Well, let's see.

CHAPTER XIII

ANTI-PLANNING

In some sense all of the approaches to systems that I have discussed thus far in this book are not really common sense approaches to systems change, or would not have been considered a common sense approach several decades ago. The idea of using behavioral scientists and planners to assist in analyzing systems and helping to change them, although as I said earlier it does have a historical background, has not been a particularly popular idea in the United States. The popular idea of how to approach a system is to get somebody to manage it. The manager is supposed to be a person with rich experience in the system and a perceptive, brilliant mind. The manager examines various aspects of the system, receives some data and reports from the staff, and then makes up his own mind what should be done. This is certainly an "anti-planning" approach to systems as I have defined planning earlier in the book. The manager in most cases cannot make explicit what steps he has taken and he feels no need to do so. The idea is that he can be judged in terms of his performance; if a young man indicates signs of being perceptive and a good leader, then he is promoted. If not, he never climbs the ladder. In this anti-planning practical school, education takes place within the system and is never made explicit.

Anyone who has had experience with managers in American industry should easily recognize this anti-planning idea. In each industry, the manager who has grown up as a railroader, steel man, lumber man, automobile man, "knows the business" and cannot see how some green outsider

could tell him anything significant. Such a manager would never think of asking a scientist how he should spend his time, or what he should pay attention to; these are matters for experience and "sound judgment" to decide.

Of course the management scientist and behavioral scientist both feel that there is a large myth about "excellent" managers. Naturally certain people have attained eminence for various reasons in society, but if one analyzes in depth the process by which they made decisions it is hard to justify that they were great and perceptive managers. Even the so-called "great" presidents of the United States is a matter of personal opinion. The popularity of Lincoln and Washington may arise, not as a result of their own ingenuity but of the creation of a public myth. It may very well be that Chester Arthur, the least known of all presidents, could be regarded as the greatest "manager," since it was under his administration that the United States government was transformed from a politically dominated system into a civil service system. In other words, the management scientist would argue that the greatness of a manager can only be determined after one has studied the system by building a model of it and comparing what the manager did against the optimal.

So there is one kind of anti-planning approach and its opposition, namely the practical approach of experience coupled with intuition, leadership, and brilliance, vs. the analytical approach of the scientist.

Perhaps a more devastating anti-planning concept is the one so often expressed by the sceptic or the determinist. The sceptic firmly believes that we can never understand even minor aspects of a system. He therefore believes that everything that we say about systems is largely a myth invented in order to carry on various kinds of conversations and entertainments. Since the nature of the real world is a mystery,

he says, we deceive ourselves when we think we are improving anything. It's true we go around shuffling things from one point to another, but in the end if you try to evaluate whether there has been any beneficial change as a result of this shuffling the sceptic believes that it is impossible to do so. He laughs at the absurdity of those who think that, for example, transportation is "better" now than it was in the days of our forefathers. He points out, for example, that a freight car moved faster in the days of the horse and cart than it probably does now on modern railroads. But even if freight moved faster, so what? Has fast movement really benefited the human being? Can we show that any technology has really proved beneficial? What is the evidence that the technological "spinoff" from science has resulted in more benefit than cost (detriment)? It was marvelous indeed to discover drugs that reduce pain and save lives, but look what harm drugs produced in the human race. Today we move faster, dress faster, eat faster, recreate faster, kill faster than any animal on earth has ever done before. To the sceptic the enthusiasms of the technologist appear to be just one more manifestation of the silliness of a human being. The sceptic is usually the ultimate pessimist.

Of course the sceptic is an arrogant fellow. The easiest thing in the world is to be a relativist, somebody who says "it all depends," and "we can never know the ultimate answers." This is something that every student who has ever dug deeply in a social problem will say. It is the mark of the sophomore in the intellectual enterprise. The one thing the sceptic rarely does is to defend his own scepticism. He simply shows the extreme difficulties of answering questions, and as a consequence he regards the difficulty as evidence of his own sceptical philosophy. To the serious-minded this kind of relativism serves little purpose and is socially irresponsible. Not that this attitude on the part of the

serious-minded will in the least deter the sceptic. His approach to systems is that there is no sound approach, and that's that.

A more serious opponent of planning is the determinist, the man who believes that major human decisions are not in the hands of human decision makers but in uncontrolled sociological forces. Recall that earlier we went in search of the decision maker, and discovered that he was hard to find; sometimes he was many people--e.g., all the citizens that have been, are and will be. But for the determinist, there is no decision maker in the sense of a person or group with an ability to choose: no one or many ever set the policies of an organization or country. For example, the growth of science for the determinist is determined by military and industrial trends in our country, trends that themselves are the products of other social forces. He sees the advent of the New Deal, the New Frontier, and the Great Society as manifestations of underlying discontent, and the attempt of the Democratic Party to answer discontent is itself determined by the basic political forces that are not in the control of any person or group of persons. The determinist is not a new creation of our society. Ever since the time of the Greeks, people have been arguing that the events in nature are fully determined and are outside the control of the human being. If the world is fundamentally deterministic, then of course it would be foolish to claim that by planning or in general by any kind of thinking we can do anything as far as the change of systems is concerned. The changes are brought about by forces outside of our control, no matter how convinced we are that we "make decisions" by our own free will.

The management scientist's reply to the determinist is to try to educate him about the scientific theory of evidence. Sophisticated management scientists will agree that if a manager really thinks he is a decision maker because he sits in his office and signs a paper, he is probably being

naive, because there is no real evidence for this belief. But the management scientist does believe that if he conducts a study in depth, certain individuals appear more likely than others to be the ones who produce the changes that occur; on the basis of enough evidence, the management scientist feels justified in calling them decision makers who have a choice. The point is that in all science one deals not with final answers but with estimates; hence the assignment of the label "decision maker" to a group of people is an estimate, to be modified in the light of further evidence. The determinist, says the scientist, has taken the obvious error of our estimates and converted it into a basis for rejecting our methodology.

Just as there will probably be no final answer to the argument between the rationalist and empiricist, there will be no final answer to the argument between determinists and non-determinists. The determinists often regard the whole attempt to study systems by means of science as a natural product of a highly militarized and industrial society. In other words, the determinist will subsume the management scientist under his own theory. The management scientist, on the other hand, will regard the determinist as someone who has arrived at his position because of psychological disappointment and that his determinism in no way represents reality but rather what is going on inside his own psyche.

There are two anti-planning positions, however, that need to be considered quite carefully. These are not strictly anti-planning in the sense of the positions just outlined, but find their base for understanding the entire system in something other than the economic or behavioral approaches described earlier in this book. The one is the religious view of the world and the other is the view of the world as a reflection of the self. I have labeled them anti-planning simply to

emphasize that they both would argue that the descriptions I have given previously of the approach to systems are misguided.

The religious approach says that the real planning of the world lies in a power or mind that is greater than the mind of all men combined. It is a world force. In the case of optimistic religions it is a world force working for good. Once this notion of a God has been introduced into the realities of the system, then one's attitude towards the whole system must change. It is no longer up to a human being to try to decide on his own what the basic values of each person are and thereby to develop a rational approach. Rather the human being must learn what God's plan is and try to adjust his behavior to it.

Those who believe in the religious point of view have a very strong argument against the pure management scientist or behavioral scientist. Recall that I have been saying throughout the book that because the management scientist and planner cannot possibly believe that he has the correct plan, he must keep thinking of his activity as a series of approximations in which each approximation in principle is better than its predecessor. But why should such a series of approximations lead anywhere? What is the guarantee that struggling as we are in the dark, we will find our way out into the light? The guarantee, says the religious world view, is some kind of superior mind that assures us children of darkness that the pathway does exist, and he who helps himself will be helped by his God.

Now the tradition of western science has been one in which the existence and properties of God are not of concern to the scientist as such. There are various reasons why the scientist arrived at this viewpoint of the system of science. One reason lies in the fierce political fights that were created when science announced its intention of divorcing

itself from religious doctrine in the fourteenth, fifteenth and sixteenth centuries. Another arises from what is called the "positivistic" attitude of scientists, namely the notion that the scientist believes what he sees, and since he cannot see a God he cannot find empirical evidence for His existence.

Nevertheless, the point is well taken that the management scientist implicitly assumes a guarantor of his activities if he sincerely thinks that he is doing something to improve systems, i.e., if he is something other than a sceptic or determinist. Indeed, for many management scientists the religious problem of the guarantor or a superior mind begins on reflection to look very much like the very problem that he himself is facing. It may in fact be a matter of nomenclature. For the person who was brought up in religious thinking the nomenclature is God; for the person brought up in scientific thinking the nomenclature is progress or approximation. The method of explicit assumption making discussed in an earlier chapter does have its implicit "god," i.e., the full expectation that an estimate made under incorrect assumptions will be corrected by other scientific workers, and that this process will continue with increasing precision and knowledge of nature. In fact, what makes the management scientist something other than a sceptic or determinist, is his belief that the world will remain safe for scientific progress.

Of course, there are many scientists who never consider the social and political foundations of science; they want to work on problems that interest them, and have no concern as scientists for the future of society or the environment that will sustain human learning. These "pure" scientists are among the strongest of the anti-planners: pure research must not be planned. But if pressed by debate, these scientists would have to admit that the future of society is an important matter for pure research; they assume that someone else in a non-scientific role will

create the safe society. This assumption, for the advocate of the religious approach to systems, is simply an act of faith on the part of the pure scientist.

Thus to the philosopher of religion there can be no question that the approach to the whole system on the part of most inhabitants of the world is through a religious world view. Consequently for him it would be foolish indeed if the planners and management scientists ignored religious world views by concentrating too hard on, say, the economic view of the world. To date there has been no real confrontation between the religious and the economic, partly because both sides wish to keep their own independence, partly because there has been really no need yet for a conversation. One can expect, however, that as the system scientists become more conspicuous and begin to make some very explicit assertions as to how the world is to be run, they will come into conflict with various religious world view positions. In some sense they have already come in conflict with those religions which believe that the matters of human decision making should be left largely to the individual and should not be planned by society.

The management scientist with his firm foundation in an advanced technology may believe that most religious world views are antiquated. The story of the Aztec and Inca cultures well illustrates the scientist's point of view. In both of these cultures there was the firm belief that the affairs of men were guided by the gods. In both, too, the gods themselves were not unified into one supreme decision maker, but rather had their own conflicts. Therefore in the Aztec culture the approach to the system consisted in trying to appease the gods by various kinds of religious rites, and especially human sacrifice. But in appeasing one god

another god might become irritated, with consequent harm to the human system. Hence the Aztec and Inca rulers tried to understand their system by understanding the system of the gods. Along comes a highly "advanced" society, the Spanish Conquistadors with their technological instruments, and they put an end to the quaint religious views of the decision makers of the Aztec and Inca cultures. In somewhat the same manner the management scientist may think the advanced technologies we are creating today will put an end to any quaint ideas about the manner in which a god or gods influence the systems in which we live.

This scepticism about the traditional religious outlook is all the more reason for a confrontation between religion and science in the context of the design of social change. There clearly is no more reason for religion passively to adapt to technological change than there is for science to adapt to traditional religion. The critical issue for the systems approach is to identify the religious assumptions implicit in any proposal for change, be it the poverty program, a war, or cost reduction. When such a confrontation of religion and science takes place, the meaning of planning will change, and the religious type may cease to be an anti-planner; he may be an anti-planner today only because planners do not include the determination of religious assumptions in their list of planning activities.

The second anti-planning approach is based on the analysis of self. It is the position that the world as it really exists, exists in the individual self. As a consequence the planning of total systems is nonsense unless by this term is meant the fullest expression of the individual self. To those who take this point of view, which is the point of view of the inner life, the problem of living consists of the attempt to understand what we are really like in ourselves and the different kinds of

selves that we are. There is the power dominated self, the master who wishes to overcome, and in the process of attempting to overcome becomes himself the slave of his own domination. Or there is the conservative self, who wishes to keep the world as it is, to keep his possessions and to keep his ideas. And he is overcome by the revolutionary self, where the revolution is generated out of the very activities of the conservative. There is the annihilated self, where all existence becomes trivia. There is the immediate self, which finds its value in the here and now, and completely denies the meanings of ends and means. Or there is the visionary self that looks for the savior and finds often instead the Devil. In all of this searching for the self there is nothing that looks in the least like the speculations of the management scientist and behavioral scientist. Indeed, for the self seeker it is totally inappropriate for the behavioral scientist to classify people into types by observing their behavior, as may seem implied by the phrases "power dominated," "conservative," "revolutionary," etc. What a person seems to do in the eyes of another, is in the self of the observer, not the self of the observed. In other words, the "results" of behavioral science tell us mainly what behavioral scientists are like, not what people are like in general. The "recommendations" of the management scientist are an expression of his inner being and have nothing to do with "optimal" changes in reality.

So runs the philosophy of the self. In this philosophy there is no talk of systems, components and measures of performance, or indeed improvement in the scientist's sense of the word. Whatever improvement is going on in the pictures of the self is an improvement of the person's understanding of himself and has nothing whatsoever to do with the notions of progress that are implicit in management science and planning.

To the scientist the challenge is either old hat or meaningless. Science has long since learned the need to disentangle the personality of the observer and model builder from the rest of reality. Every observation,

no matter how carefully made, has something of the observer and something of his instruments within it. The problem, in the scientist's language, is to separate out the "invariances," those characteristics of observation that remain no matter who is observing with what instrument. Such invariances, says the scientist, are not attributable to the "self." Sometimes, however, they are attributable to a "group self," when the experts deceive themselves because they all agree. Just as it has long since been recognized in science that we must get rid of the "personal equation," so now the scientist recognizes that we must get rid of the "social equation." But once we do, what remains invariant is our best estimate of reality. If the "self philosopher" still claims that reality is "beyond" these invariances, he must be talking nonsense. The scientist has struggled long and hard to make his concepts "operationally" precise, and he is not about to regress by acknowledging the meaningfulness of "self" in any but the purely operational, empirical sense.

To this rebuttal, the self philosopher will respond that the physical sciences may have discovered the invariances, but not the social sciences. In particular, he will say, the attempts to remove the personal and group equation from the so-called measure of human value have all failed. He finds every aspect of the economist's and behavioral scientist's approach to values as no more than a reflection of their own self, and having nothing whatever to do with the reality of human values in general. Consider, for example, that sacred "axiom" of both the economist and behavioral scientist that declares once and for all that human values can be ordered from highest to lowest. Why should this be so? True, our backward culture has forced upon us the need for trading A for B, and hence has made us "order" our value system. But in the real self of many people, this niggardly way of expressing deep human feelings is

far from reality. The scientist will reply that we could never plan rationally if we gave up the ordering of values, because what would "optimal" possibly mean? To this the philosopher of the self responds "so much the worse for planning; you have reduced it to its obvious absurdity."

If the confrontation of science and religion has been weak, the confrontation of science and the self has been weaker still. Only in psychoanalysis does the debate flourish, but very few think of applying psychoanalytic theory to the "systems approach." It might help a great deal, for example, if "poverty" could be defined in something other than economic terms; we might then discover how many poor people there are in our rich culture.

Finally among the anti-planners there is the completely non-intellectual approach, the approach that does not believe that thinking in any of its senses is important in the development of human life. It is the approach that finds the essence of value in the song, the painting, the vision, the myth, the feminine, and ultimately the unspoken. What is not said at all is the most important thing of all. Since the management scientist, planner, and behavioral scientist spend all their time speaking, then it must be the case that what they spend their time on is the least important part of human life.

Here the confrontation is deepest of all. What shall we say to the person who thinks that saying so violently distorts human feelings? Shall the scientist say that his point of view represents the absurd, or that it represents those parts of human living that have still not been "swept" into his models? Or do we have to say that the basic aspects of human values have never been and never can be represented by the approaches to systems that the management scientist,

planner, and behavioral scientist adopt?

The richest thing I think we can gain from the discussions of anti-planning is the understanding of the really basic conflict. In the process of preparing proposals, conducting research and writing out recommendations, the management scientist and planner are apt to become convinced that their approach to systems is the correct approach. They become supported in this idea if the manager or politician goes along with them. They are even further supported if the recommendation is implemented, and they see their freeways, medical systems, educational systems, in actual existence. What they forget of course is that unseen, unheard part of humanity that has never entered into the domain of their vision or thinking. What they fail to see in their detailed analysis of cost-benefits is that the system they have created may be largely irrelevant or perhaps even partially destructive for the person who finds his life in the religious, or in the search for the self, or in the completely nonintellectual.

There is something fiercely ugly at times about the proposal writing, testing, and discussion of large-scale systems. It's much as though the whole life of the system had been depleted in an attempt to put it into a rational mode.

In any event, although I would regard myself as an optimistic scientist, I didn't see how a book on the systems approach could be written without discussing the anti-planner. He must surely view the persons who undertake to plan and to implement the plan as intruders and snoopers. Snoopers, because, using the methods of behavioral scientists, they come into a person's life to steal information from him. Intruders, because they believe it perfectly appropriate to interrupt or change the pattern of one's living without even so much as a "please."

Furthermore, if there is a bit of conscience among the planners, they feel perfectly satisfied if the persons interviewed or planned for say that they are willing to have the interview or the plan made. This willingness on the part of the person in no way excuses the unforgivable behavior of many a planner and behavioral scientist.

In fact, I think that anti-planning must essentially be regarded as a fundamental part of the systems approach. I cannot see that any approach to systems can stand by itself. Its only method of standing is to face its most severe opposition.

CHAPTER XIV

CONCLUSION

To write a chapter which concludes a debate of the kind that has been carried on in this book is impossible. There can be no conclusion. The best that can be done in a concluding chapter is to say something about this raconteur, this third party, who sat aside and felt perfectly free to discuss various approaches to the system as though he himself were free of suspicion. Who is this author, after all? Is he really the scientist or planner? Or the anti-planner? Or what? Which side is he on? Where does he stand? Is he free from suspicion and criticism simply because he looks at all of these activities from many different viewpoints? Is his the supersystem approach?

When I began to write this book on a request from the publisher, I thought of it more or less as a popular text on the systems approach in which I would discuss many of the techniques and methods. But as I got down to the writing in earnest, I began to see how difficult it was simply to describe to the reader how the management scientist behaves and persuade him that this behavior had some real benefit. In a way the very writing of the book forced me into the debate. The only tolerable way to write a book of this kind was to inject the criticism in the very context in which a technique was being discussed. Indeed, if I were to think of one theme that has been in the back of my mind as I wrote these chapters, it is the theme of deception. You see, the management scientist at the outset felt that the efficiency expert was deceived. The efficiency

expert, he said, believes that when he sees idleness and slack in the system he is looking at a reality. From the management scientist's point of view he is looking at an illusion. He is tricked by his perceptions, so to speak. But then the management scientist, when he becomes very serious about his own models where "all" of the objectives are represented and a "proper" compromise is created, also is deceived. In the straight-faced seriousness of his approach he forgets many things: basic human values and his own inability really to understand all aspects of the system.

I came to this notion of deception by a brief experience with extrasensory perception. There I was amazed to see how many psychologists had taken extrasensory perception so seriously. Extrasensory perception is a way of looking at the world, a world view in which some human beings have an ability of receiving messages from the future or from distant places or whatever, without the use of the ordinary sensory apparatus. Those who believe in extrasensory perception were deadly serious about it. They kept their straight face because one crack of a smile would indicate a weakness on their part and lay them open to the even more severe attacks from their enemies. But what was also interesting was the deadly seriousness of their opponents. Extrasensory perception apparently was no joke. If it succeeded, it would destroy the basis of psychology, or perhaps even of physical science. Hence, although it could not be taken seriously, it could not be taken humorously either. In both cases, deception, it seemed to me, was rampant. Perhaps the believer in extrasensory perception in his severe insistence on the existence of mysterious contacts with reality is deceived; but so also, it seems to me, is the serious-minded scientist who is completely convinced that there is only

one way to look at reality, namely through the recognized sensory channels that have been laid out in the foundations of psychology.

Carrying over this experience of extrasensory perception to the systems approach, I arrive at the conclusion that however a systems problem is solved, by planner, scientist, politician, anti-planner or whatever, the solution is wrong, even dangerously wrong. There is bound to be deception in any approach to the system.

And yet when one looks at the solution and sees its wrongness, one is also deceived, because in searching for the wrongness one misses the progressive aspect of the solution. We have to say that the advocate of the solution both deceives and perceives. We have to say that the solution is ridiculous and serious. We have to maintain the contradiction or else we allow ourselves to be overwhelmed by the consistent.

And so in the end I come to science, which has been the main topic of conversation in the entire book. At no one point did I stop to define for the reader what science means for me, although once or twice I characterized it in terms of observation and reasoning. I think it's deceptive to look at science solely as a series of activities carried on by people who call themselves scientists. Science itself is a system subject to considerable change, as we have seen in the last few centuries. It's very deceptive to believe that science has arrived at a plateau where its own change is minimized. Instead the science of our society has to be looked at as a system itself subject to change. If the anti-planner really believes that he has arrived at a truth about himself or about the way in which God governs the systems of the world, then the anti-planner as a scientist may be a deceived scientist, just as he believes that the management scientist is deceived.

mathematical problems are unsolved. It's not as though we can expect that next year or a decade from now someone will have found the correct systems approach and all deception will disappear. This, in my opinion, is not in the nature of systems. What is in the nature of systems is a continuing perception and deception, a continuing re-viewing of the world, of the whole system and of its components. The essence of the systems approach, therefore, is confusion as well as enlightenment. The two are inseparable aspects of human living.

In the end I write down the principles of my own deception-perception of systems:

1. The systems approach begins when first you see the world through the eyes of another.

Another way to say the same thing is that the systems approach begins with philosophy, because philosophy is the opportunity to see the world through the eyes of Plato, Leibniz, Kant. The reading of philosophy is not an abstract study; the serious student takes on the burden of becoming convinced that each important philosophical position is right, absolutely right. He relives the intellectual vitality of the past. He feels to the utmost that the real world is the modeled world; that the real world is the experienced world; that the real world is dialectical; and so on. He does all this without losing his own individuality.

2. The systems approach goes on to discovering that every world view is terribly restricted.

That is, every "world view" looks only at a component of some other system. For those that think in the large, the "world" is forever expanding; for those that think in the small, the inner world is forever contracting.

The ultimate meaning of the systems approach, therefore, lies in the creation of a theory of deception and a fuller understanding of the ways in which the human being can be deceived about his world and an interaction between these different viewpoints.

As I have been writing this book, the U.S.A. has been waging a serious war in Southeast Asia. Is there a systems approach to warfare? Not in the minds of most observers and participants. The hawks want to win, to "stop aggression," to "support our national policy." They can't look at the situation in any way except their own way. They regard peace demonstrations as "support of the enemy." The doves say the war is ridiculous, that we must "pull out"; they can't look at the situation in any way but their own way.

In the beginning I listed some things the world could very well afford to do: feed and clothe its poor, for example. But each person looks at this problem in such a one-sided way that the systems approach is lost.

Hence, I too am biased and deceived. It's naive to think that one can really open up for full discussion the various approaches to systems. People are not apt to wish to explore problems in depth with their antagonists. Above all, they are not apt to take on the burden of really believing that their antagonist may be right. That's simply not in the nature of the human being.

Well, then, what is the systems approach? On the one hand, we must recognize it to be the most critical problem we face today, the understanding of the systems in which we live. On the other hand, however, we must admit that the problem, the appropriate approach to systems, is not solved, but this is a very mild way of putting the matter. This is not an unsolved problem in the sense in which certain famous

3. There are no experts in the systems approach.

As I was writing this final chapter, I turned on the Sunday TV for relaxation. There were a Catholic priest and an Episcopalian minister discussing the "new morality." The priest was saying that many people believe now in "situational ethics," doing what seems right to you at the moment. The minister replied that he knew of no reputable theologian who took such an extreme view. The priest looked startled; he'd thought that the "new" morality referred to the younger generation and their older admirers in the public, and not to the opinions among the experts. He was right, of course. The real expert is still Everyman, stupid, humorous, serious and comprehensive all at the same time. The public always knows more than any of the "experts," be they economists, behavioral scientists, or whatever; the problem of the systems approach is to learn what "everybody" knows.

And finally my bias:

4. The systems approach is not a bad idea.